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Phone (503)255-5050 • Fax (503)255-0505
www.horizonengineering.com

Project No. 4288

SOURCE EVALUATION REPORT

Clearwater Paper Corporation
Lewiston, Idaho

VOC Leak Checking

No. 1 and No. 2 PR Washers

October 27, 2011

Test Site:

Clearwater Paper Corporation
803 Mill Road
Lewiston, Idaho 83501

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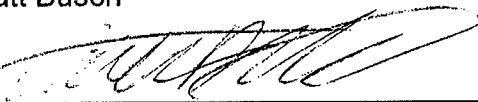
1. CERTIFICATIONS

1.1 Test Team Leader

I hereby certify that the test detailed in this report, to the best of my knowledge, was accomplished in conformance with applicable rules and good practices. The results submitted herein are accurate and true to the best of my knowledge.

Name: Matt Busch

Signature



Date

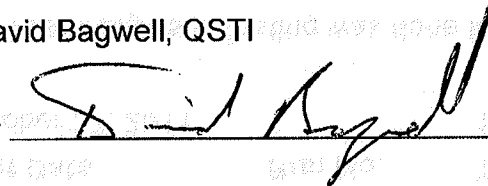
12-12-11

1.2 Report Reviewer

I hereby certify that I have reviewed this report and find it to be true and accurate, and in conformance with applicable rules and good practices, to the best of my knowledge.

Name: David Bagwell, QSTI

Signature



Date

12/15/11

2. INTRODUCTION

2.1 Test Site: Clearwater Paper Corporation
803 Mill Road
Lewiston, Idaho 83501

2.2 Mailing Address: P.O. Box 1126
Lewiston, Idaho 83501

2.3 Test Log:
Positive Pressure Leak Checking
PR Washers No. 1 & 2

Test Date	Run No.	Test Time
October 27, 2011	1	15:21–15:26

2.4 Test Purpose: Testing was done for internal informational purposes

2.5 Participants:

Horizon Personnel:
Matt Busch, Team Leader and Report Review
David Bagwell, QSTI, Report Review
Christopher D. Lovett, QSTI, Technical Writer

Test Arranged & Observed by:
Rick Wilkinson, Clearwater Paper Corporation

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***** HORIZON ENGINEERING *****

3. SUMMARY OF RESULTS

3.1 Leak Definition:

- Detectable leak concentration: 500 ppmv (as methane) above background
- Reference Subpart: 40 CFR 63, Subpart S, 63.450(c) and 63.457(d)

3.2 Summary of Results

A single check on each component in the two PR Washer systems was completed. No detectable leaks as defined in the applicable subpart were found at any location.

3.3 Quality Control / Quality Assurance Procedures

QA procedures outlined in the test method were followed, including equipment specifications and operation, calibrations, and performance tolerances. EPA Method 21 details the following:

- Instrument Specifications standards (Sections 6.1 to 6.6)
- Calibration Precision (Section 8.1.2)
- Response Time (Section 8.1.3).

The record of the Calibration Precision and Response Time are on the Analyzer Field Data sheet. Specifications of the instrument used and the results of specific checks are summarized in Tables 1a and 1b.

Table 1a

EPA Method 21 Instrument Specifications

Applicable Section	Method Requirements	Equipment Specification	Meets Requirements
6.1	Detector Type:	Thermo Electron TVA 1000B Portable Flame Ionization Detector	Yes
6.2	Measurement capabilities within specified ranges for leak definition concentration:	0.5 to 10,000 ppm CH ₄ – dynamic range 0.5 to 50,000 ppm CH ₄ – linear range	Yes
6.3	Instrument meter readable to \pm 2.5% of specified leak definition concentration (=12.5 ppm CH ₄):	Minimum detectable limit 1.8 ppm CH ₄	Yes
6.4	Electrically driven pump:		Yes
6.4	Nominal sample flow rate between 0.10 – 3.0 L/min:	1.0 L/min	Yes
6.5	Probe or Probe Extension Outer Diameter:	\leq 0.25 inches	Yes
6.6	Explosive Atmosphere Safety Specifications:	Class I, Division 1, Groups A, B, C, D Hazardous Locations	Yes

Table 1b

Calibration Precision and Response Time

Calibration Gas	Concentration	Calibration Precision	Avg. Response Time
Zero Gas	0.0 ppmv CH ₄	NA	10 seconds
Span Gas	502 ppmv CH ₄	0.30%	10 seconds

4. SOURCE DESCRIPTION AND OPERATION

4.1 Process and Control Device Description and Operation:

The brown pulp is washed to remove the spent pulping liquors and dissolved solids from the pulp. Some of this liquor is recycled to the digesters while the major portion is sent to the Recovery Area. The weak black liquor is washed from the pulp at the pre-oxygen washers and all brownstock washer system gases are collected in a high-volume low-concentration (HVLC) system and thermally oxidized.

5. SAMPLING AND ANALYTICAL PROCEDURES

5.1 Sampling Procedures

5.1.1 Sampling and Analytical Methods

Test Methods Used: Testing was done in accordance with EPA Method 21 in 40 CFR 60, Appendix A, July 1, 2007. The regulations that specify this are incorporated in 40 CFR 63, Subpart S, July 1, 2007: 63.450 Standards, paragraph (c), 63.453 Monitoring requirements, paragraph (k)(3) and 63.457 Test methods and procedures, paragraph (d).

The portable flame ionization detector (FID) was calibrated in the field according to the manufacturers' specifications using 502 ppmv methane gas. Instrument zero was done using bottled zero air gas.

5.2 Horizon Test Equipment

Equipment Name

Portable FID

Identification

Thermo Electron TVA 1000B (FID)

Portable Flame Ionization Detector

6. DISCUSSION

The results of the testing should be valid in all respects. All quality assurance checks including instrument checks and calibrations were within method-allowable tolerances.

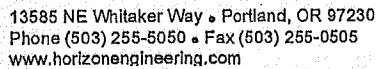
APPENDIX

Field Data

Analyzer Calibration Worksheet

Calibration Precision Worksheet

VOC Leak Check & Analyzer Field Data



Client: Clemewater Paper
Name: Busch
Job #: 4288
Date: 10-27-11
Source: HVLC
Method: 21

Initial Calibration:	Gas Type	Cyl. Value	Instr. Response			Response Time		
High Cal: 26931	CH ₄	502	501	495	503	10	10	10
Zero Cal: 5121	Air	<1	4.11	0.16	0.09	10	10	10
Time:	13:52							
Final Calibration:	Gas Type	Cyl. Value	Instr. Response			Response Time		
High Cal: 26931	CH ₄	502	505	501	498	10	10	10
Zero Cal: 5121	Air	<1	1.11	1.21	1.34	10	10	10
Time:	16:20							
						Response time must be less than 30 seconds to reach 90%.		

Calibration Precision (high cal):

$$(((\text{Instr. Response-Cyl. Value}) + (\text{Instr. Response-Cyl. Value}) + (\text{Instr. Response-Cyl. Value})) \div \text{Cyl. Value}) \times 100$$

Calibration precision must be equal to or less than 10% of the cal gas value.

[illegible]

Method 21 Calibration Precision Worksheet

Clearwater Paper
10/27/2011
Calibration Precision

Initial	cal gas	501	495	503	Average	Cal Precision, %	criteria = 10%
Algebraic Difference	502	1	7	-1	2.3	0.46	
Algebraic Difference	0	4.11	0.16	0.09	1.5		
Algebraic Difference		4.11	0.16	0.09			
Final	cal gas	505	501	498	Average	Cal Precision, %	0.30
Algebraic Difference	502	-3	1	4	0.7	0.13	
Algebraic Difference	0	1.11	1.21	1.34	1.2		
Algebraic Difference		1.11	1.21	1.34			



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Client Clearwater Paper Name Matt Bosch
Job # 4288 Date 10/27/11

Tester: (print) Matt Bosch
Tester: (sign) _____
Background: _____
Start: 1521
Stop: 1526
Results (circle one): leaks detected / not detected

No. 2PR Washer
015-2000

1	ND
2	ND
3	ND
4	ND
5	ND
6	ND
7	ND
8	ND
9	ND
10	ND
11	ND

No. 1 PR Washer
015-1000

1	ND
2	ND
3	ND
4	ND
5	ND
6	ND
7	ND
8	ND
9	ND
10	ND
11	ND

Door

10/27/2011

#'s 1 + 2 PR washer

Start = 15:21

Stop = 15:26

No valves / Detection > 500 ppm

Process Data
Process and Operation Data

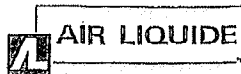
No. 1 and No. 2 PR Washers

Date/Start Time: 10/27/2011 15:21
 Date/ Stop Time: 10/27/2011 15:26

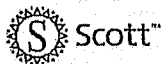
	1 PR Washer (Stock Flow)	1 PR Washer (RPM)	2 PR Washer (RPM)	Area 15 Production Rate (ODTP/Day)
	FI5526.PV	SIC5550.PV	SIC5560.PV	FYI7890.PV
27-Oct-11 15:21:00	11919.31	1.84	1.19	463.98
27-Oct-11 15:22:00	11967.22	1.84	1.11	463.96
27-Oct-11 15:23:00	11845.18	1.79	1.21	463.95
27-Oct-11 15:24:00	11785.18	1.70	1.18	463.93
27-Oct-11 15:25:00	11833.02	1.72	1.13	463.91

[illegible]

Calibration Information
Calibration Gas Certificates



Air Liquide America
Specialty Gases LLC



A-8

Shipped 500 WEAVER PARK RD
From: LONGMONT CO 80501
Phone: 888-253-1635 Fax: 303-772-7673
C E R T I F I C A T E O F A N A L Y S I S

HORIZON ENGINEERING
13585 N.E. WHITAKER WAY
PORTLAND OR 97230
US

DOCUMENT#: 41390850 -001
PO#: 1336
ITEM #: T100-105
DATE: 05Apr2011

FILL PRESSURE: 1000 PSIG
SCOTT LOT#: LOT080000833

PRODUCT EXPIRATION: 04Apr2013

PURE MATERIAL: AIR

CAS# 132259-10-0

GRADE: ZERO AIR

PURITY: -

<u>IMPURITY</u>	<u>MAXIMUM CONCENTRATIONS</u>	<u>ACTUAL CONCENTRATIONS</u>
THC	1 PPM	< 1 PPM
O2	20 TO 21%	=20 TO 21%

CGA C-10

MANUFACTURED DATE: 05Apr2011

SCOTTY SIZE: 105

ANALYST: WAYNE JOHNSON

**AIR LIQUIDE**Air Liquide America
Specialty Gases LLC

Scott™

m-8

Shipped 500 WEAVER PARK RD
From: LONGMONT CO 80501
Phone: 888-253-1635 Fax: 303-772-7673
C E R T I F I C A T E O F A N A L Y S I S

HORIZON ENGINEERING
13585 N.E. WHITAKER WAY
PORTLAND OR 97230
US

DOCUMENT#: 41390850 -003
PO#: 1336
ITEM #: T263-105
DATE: 06Apr2011

FILL PRESSURE: 1000 PSIG
SCOTT LOT#: LOT080000831

PRODUCT EXPIRATION: 05Apr2013

<u>COMPONENT</u>	<u>REQUESTED GAS</u>	<u>ANALYSIS</u>
	<u>CONC MOLES</u>	<u>(MOLES)</u>
METHANE	500. PPM	502. PPM
AIR	BALANCE	BALANCE

CGA C-10

MANUFACTURED DATE: 06Apr2011

SCOTTY SIZE: 105

ANALYST: 

WAYNE JOHNSON

QA/QC Documentation
Portable FID Instrument Specifications

TVA1000B Technical Specifications

Safety certifications	FM (Class 1, Div. 1, Groups A,B,C&D Hazardous Location, Temp. Class T4) CENELEC (Div. 1, Zones I and II Group IIC, Hazardous Location, Temp. Class T4)*
Datalogging	Onboard
Readout	Bar graph & 4- digit LCD
Dynamic Range	0.5-2,000 ppm (PID) isobutylene; 0.5-50,000 ppm (FID) methane
Linear Range	0.5-500 ppm (PID) isobutylene; 0.5-10,000 ppm (FID) methane
Response Time	3.5 seconds
Minimum Detectable Limit	100 ppb benzene (PID); 300 ppb hexane (FID)
Alarms	Low, high, STEL
Sample Flow Rate	1,000 cc/min nominal
Power	Rechargeable NiCd Battery
Logging Capacity	800-18,000 points mode specific
Temperature Range	0-40°C (32°F - 104°F)
Fuel	None required (PID); 99.995% hydrogen (FID)
Portable Operation Time	8 hours (with reference operating conditions)
Approximate Mass	5.8 kg (13 pounds)
Nominal Dimensions	13.5 x 10.3 x 3.2 inches (343 x 262 x 81 mm)
Analog Output	0-2V dc
Repeatability	+/- 1% (PID); +/- 2% (FID)
Autoranging	Yes
Diagnostics	Yes
Other Available Options:	
Carrying Case	P/N CR012XL
Charcoal Filter	P/N 510095-1
FID Calibration Kit	P/N CR009UY
PID/FID Calibration Kit	P/N CR012UH

* Enhanced probe and DataManager not CENELEC certified as of publication date

A world leader in high-tech instruments, Thermo Electron Corporation helps life science, laboratory, and industrial customers advance scientific knowledge, enable drug discovery, improve manufacturing processes, and protect people and the environment with instruments, scientific equipment and integrated software solutions.

Based in Waltham, Massachusetts, Thermo Electron has revenues of more than \$2 billion, and employs approximately 11,000 people in 30 countries worldwide. For more information, visit www.thermo.com/ih



Lit: TVAMC703

Environmental Instruments 27 Forge Parkway Franklin, MA
First Responder / 02038
Industrial Hygiene Products

Portable Toxic Vapor Analyzer

The TVA1000B is the only over-the-shoulder portable vapor analyzer that offers both PID (Photo Ionization Detection) and FID (Flame Ionization Detection) in a single, easy-to-use instrument. The ability to utilize both technologies in this field proven instrument provides benefits in reduced weight and a single user interface. The user can easily monitor and log inorganic and organic vapors simultaneously.

FID Detection

Users can measure a wide variety of organic vapors over an impressive dynamic range (0-50,000 ppm), monitoring some compounds that the PID will not detect. The flame ionization detector operates by breaking hydrocarbon bonds and is not limited by the ionization potential of the molecule.

Simultaneous FID/PID Detection

No other instrument offers both Photo Ionization and Flame Ionization Detection operating simultaneously in a single portable vapor analyzer. Dual detection eliminates the time, expense and trouble of purchasing and maintaining two separate analyzers.

With PID detection, the user has not only the ability to monitor for organic compounds, but also can detect many inorganic compounds. Some compounds detected by PID and not FID are ammonia, carbon disulfide, carbon tetrachloride, formaldehyde, and hydrogen sulfide. The PID also has the advantage

of not requiring fuel or air to operate. In anaerobic environments, the TVA1000B PID can be used.

Applications

Fugitive Emissions Monitoring

The unique dual detector FID/PID design can handle a wide range of compound vapors present at processing plants. The TVA1000B will permit monitoring at lower ppm levels.

Emergency Response

For reliable measurements of hazardous spills or emissions, the TVA1000B responds quickly in an emergency. The ability to quickly detect the presence of "hot spots" is key to locating the source of the hazard.

Hazardous Waste Site Evaluation

The TVA1000B allows quick and easy identification of the hazard location and quantifies the level of contamination.

Underground Storage Tanks

The TVA1000B is a primary tool for determining if a UST is leaking and the extent of the contamination.

Industrial Hygiene

The TVA1000B can help you maximize the effectiveness of your plant ventilation system, and identifies trouble spots. Use it to survey ambient vapor levels in specific breathing zones or in general plant environments, and log for further follow-up action.

Natural Gas Leak Detection

The TVA1000B enables quick and easy detection of natural gas leaks.

Key Features

- Simultaneous FID/PID or Single FID detector(s)
- Portable and lightweight
- Multiple response factors and curves
- Multi-point calibration
- On-board datalogging
- 8 hour battery life

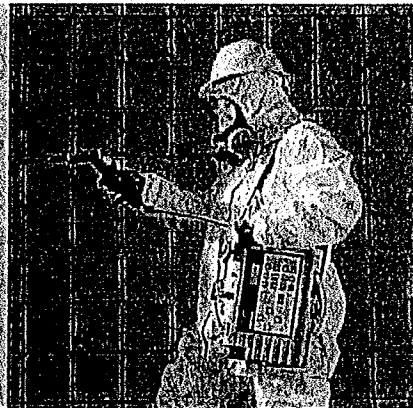
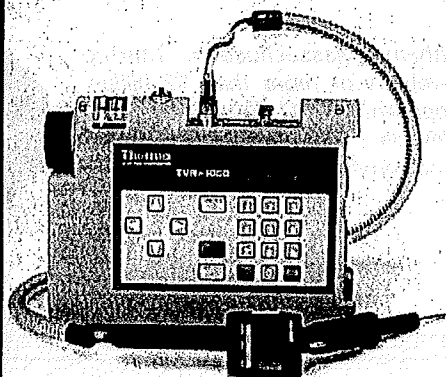
Probe Options

• *Standard Probe*

Display measurement values on a 4-character LCD, with measurement units displayed on %, ppm, or ppb. Additionally, a bar graph indicator provides an indication of concentration level. Function keys allow selection of analyzer functions.

• *Enhanced Probe*

Originally designed for Fugitive Emissions monitoring, the enhanced probe has a larger display area than the basic probe. This provides a display of up to 6 lines x 20 characters, plus a double height concentration value. It displays all the same information as the standard probe and has menu-driven access to many of the analyzer functions, allowing them to be easily initiated and/or changed at the probe.



TVA1000B
Data Manager Accessory:
Route Management Probe

Powerful field capabilities

The TVA1000B Data Manager allows users to modify or create route data in the field, eliminating the need for manual recording of data. This helps you comply with the electronic data storage requirements within most consent decrees. The new probe has a highly visible 360 degree LED with a pulsed rate linked to concentration.

The DataManager provides access to all of the features previously available only through the sidepack. Users can also easily search and navigate between tags in a route by simply entering the desired tag identifier.

Flexibility and control

The DataManager allows control of how data is viewed and accessed in the field. This allows the user to customize the view to best meet the monitoring needs at your facility, as each route may have different fields and screen displays. Fields may be designated as non-editable to enhance data integrity and database security.

An optional comment field allows the user to make electronic notes about each tag monitored. An alpha-numeric keypad makes data entry a snap.

**Key Features for the
DataManager**

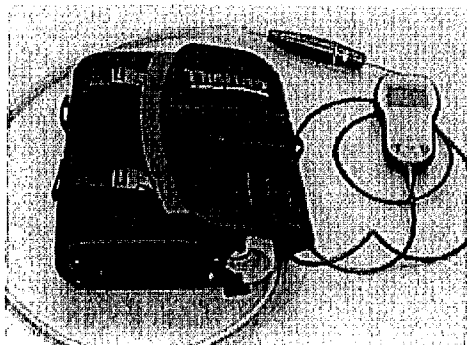
- Custom field labels for more clearly identified route information
- Definable screen layouts optimize user efficiency
- Pick lists lead to consistent data entry and minimize chance of data entry errors
- One button selections to access most commonly used functions
- New sample probe provides 360 degree visual indicator of concentration level
- Cable management system eliminates snagging sample line and electronic cable
- Existing TVA1000 units may be upgraded
- Enhanced filtering system removes dirt and water more efficiently.

ThermoConnect Software

ThermoConnect enables users of the TVA1000B to transfer, display, analyze, and configure data from the instrument using a computer. ThermoConnect is windows based and facilitates the importing of data into other Windows based applications making it easier to retrieve logged data.

- Added capability to maximize the TVA DataManager's features

ThermoConnect has been updated with a powerful new utility to create new route database template files. This utility allows you to easily build your own route database and design the screen appearance through a four-step process. Also, any existing route files in the old file format are still recognized by the TVA and may be upgraded to the new format.



The **TVA1000B** is a benchmark for experience and reliability in Fugitive Emissions Monitoring